*TDP-643R PLUS*

# DIRECT THERMAL BAR CODE PRINTER

## SERVICE MANUAL

# TDP-643R PLUS BAR CODE PRINTER

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# 1. FUNDAMENTALS ABOUT THE SYSTEM

## 1.1 Overview

### 1.1.1Front View

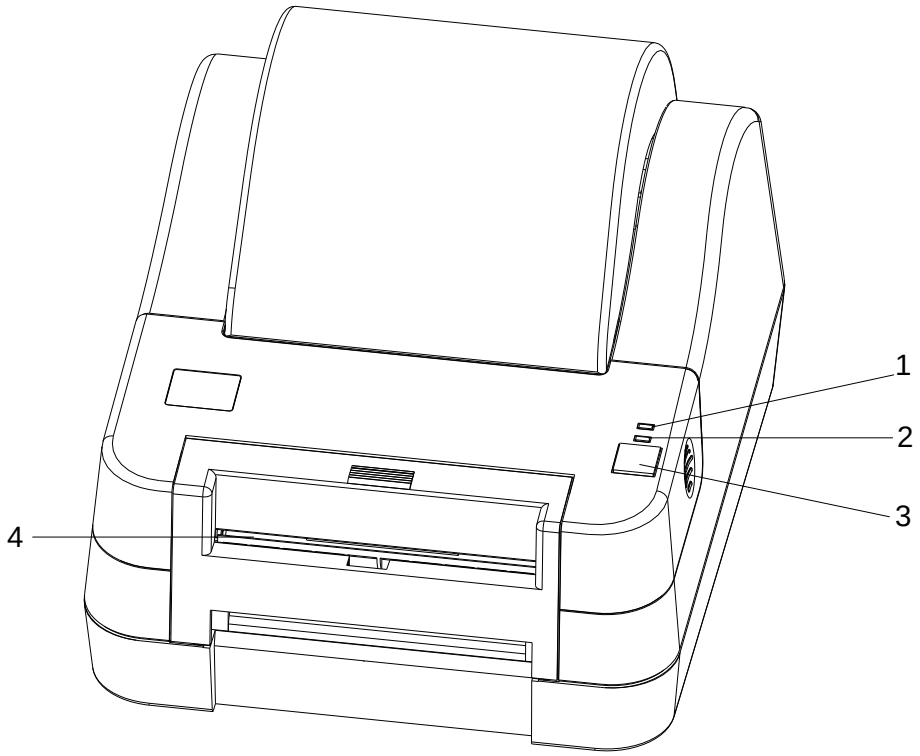



**Fig. 1-1 Front View of TDP-643R PLUS**

1. ERROR Indicator
2. READY Indicator
3. FEED Button
4. Label Dispense Opening

## 1.1.2 Rear view

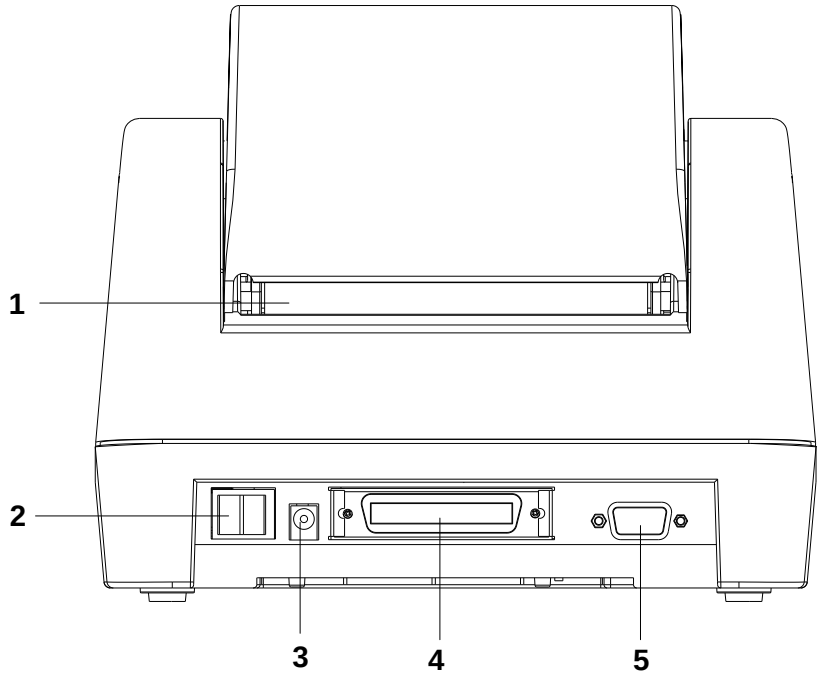



**Fig. 1-2 Rear View of TDP-643R PLUS**

1. Label Insert Opening
2. Power Switch
3. Power Jack
4. Centronics Interface Connector
5. RS-232 Port

# 1.2 Printer Specification

## 1.2.1 Printer

| | |
|---|---|
| Type | Direct Thermal Printing |
| Resolution | 203 DPI ( 8 dots per mm) |
| Printing speed | 1.5”, 2”, or 3”/sec |
| Font styles | Five alphanumeric Fonts from 0.059”H (1.5 mm) to 0.23” (6.0mm), expendable vertically and horizontally up to 8X. Smooth fonts may be download from Windows label design software |
| Bar Codes | Code 39, Code 93, Code 128 UCC, Code 128 (Subsets A, B, C), Codabar, Interleaved 2 of 5, EAN-8, EAN-13, UPC-A, UPC-E, EAN and UPC with 2 digits add-on |
| 2D bar codes | PDF-417, Maxicode, DataMatrix |
| Graphics | Mono PCX format |

## 1.2.2 Indicators and Button

| | |
|---|---|
| Indicators | READY, ERROR |
| Button | FEED |

## 1.2.3 Communication Interface

| | |
|---|---|
| Communication | RS-232C (DB-9) at 2400, 4800, 9600, 19200 baud rate and standard Centronics interface. |
| Character set | ANSI ASCII character set |
| Word Length | 7 or 8 data bits, I start bit, 1 or 2 stop bits, and even, odd or none parity. |
| Handshaking | Xon/Xoff and DSR/DTR |
| Input Buffer | 60KB |

## 1.2.4 Power Requirement

| | |
|---|---|
| Input Voltage | Switching power, 100-240 VAC, 50-60 Hz |
| Output Voltage | 24 VDC |
| Circuit Protection | 2A maximum |

## 1.2.5 Environment

| | |
|---|---|
| Operation Temperature | 41$^{O}$F~ 95 $^{O}$F ( 5 $^{O}$C ~35 $^{O}$C) |
| Storage Temperature | -4 $^{O}$F ~ 140 $^{O}$F ( -20 $^{O}$C ~60 $^{O}$C) |
| Operation Humidity | 30%~85% non-condensing |
| Storage Humidity | 20%~95% non-condensing |
| Ventilation | Free air movement |

## 1.2.6 Dimensions

| | |
|---|---|
| Size | 220 mm (W) x 263 mm (L) x 180 mm (H)<br>8.3” (W) x10.3” (L) x 7.1” (H) |
| Weight | 1.67kg |

## 1.3 Communication Interface

The TDP-643R PLUS bar code printer is designed to work with any kind of computer device that is capable of generating ASCII output data. Depending on the model, the printer can be connected to a computer via its standard RS-232 or Centronics interface.

### 1.3.1 Serial Interface

The serial port of TDP-643R PLUS bar code printer is factory set to 9600 baud, no parity, 8 data bits and one stop bit using Xon/Xoff protocol as well as DSR/DTR handshaking.
When using an MS-DOS computer, you may want to include the following two lines in your AUTOEXEC.BAT file in order for the computer to automatically execute the commands when turned on:
MODE COM1: 96,N,8,1
MODE LPT1:=COM1;
The commands above will configure and direct the serial output to COM1 serial port. If you are to use different ports, make appropriate substitutions.

The following table shows the pin assignments of the TDP-643R PLUS RS-232 serial interface. Cable: DB9 Male to DB9 Female (PC) straight pin to pin connection or DB9 male to DB25 Female.

| 25 pin | 9 pin | Host function | 9 pin | Printer Function |
|---|---|---|---|---|
| 3 | 2 | RxD | 2 | TxD |
| 2 | 3 | TxD | 3 | RxD |
| 20 | 4 | DTR | 4 | N/C |
| 7 | 5 | GND | 5 | GND |
| 6 | 6 | DSR | 6 | RDY |
| 4 | 7 | RTS | 7 | N/C |
| 5 | 8 | CTS | 8 | RDY |

### 1.3.2 Parallel Interface

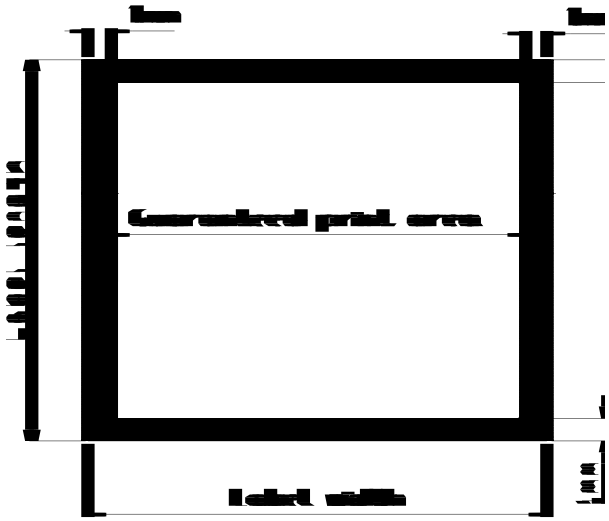
Connector Type: Centronics 36-pin

| Pin | Function | Transmit |
|---|---|---|
| 1 | /Strobe | Host |
| 2-9 | Data 0~7 | Host |
| 10-11 | Busy | Printer |
| 12 | Paper empty | Printer |
| 13 | Connect to 5V DC | Printer |
| 14-16 | N/C | --- |
| 17 | Ground | --- |
| 18 | N/C | --- |
| 19-30 | /ERROR | Printer |
| 31 | Ground | --- |
| 32 | N/C | Printer |
| 33-35 | Ground | --- |
| 36 | N/C | --- |

## 1.4 Available Bar Codes

- Code 39
- Code 93
- Code 128 UCC
- Code 128, Subsets A, B, and C
- Codabar
- Interleaved 2 of 5
- EAN-8, EAN-13, EAN-128
- UPC-A, UPC-E
- EAN and UPC with 2 digits add-on
- UPC Shipping container code
- Maxicode
- PDF-417
- DataMatrix

## 1.5 Effective Print Area



| | |
|---|---|
| Label/Ticket Length | 12mm~2286mm |
| Effective Print Length | 10mm~2284mm |
| Label/Ticket Width | 25.4mm~114mm |
| Effective Print Width | 23.4mm~112mm |
| No Print Area | 1mm |

# 2. SUPPLY SPECIFICATIONS

## 2.1 Types of Paper

Two types of media are available for TDP-643R PLUS: label and tag.

In TDP-643R PLUS, there are two types of sensors for paper: gap sensor and black mark sensor.

Label and tag can be further classified into direct thermal type or thermal transfer type.

## 2.2 Specifications

| Items | Label |
|---|---|
| Paper Width | Max.114mm |
| | Min. 25.4mm |
| Length (Pitch) | 10 ~ 2286mm |
| Thickness | 0.06 mm – 0.25 mm |
| Max. Roll Diameter (1” core) | 5" (127mm) |
| Roll Up Method | Print surface wound outside as standard |
| Paper Core ID. | ϕ25.7±0.3mm |

**Note:** (1). The width and thickness quoted above are said of the label plus its backing paper.

(2). Likewise, the approval of label entails that of its backing paper.

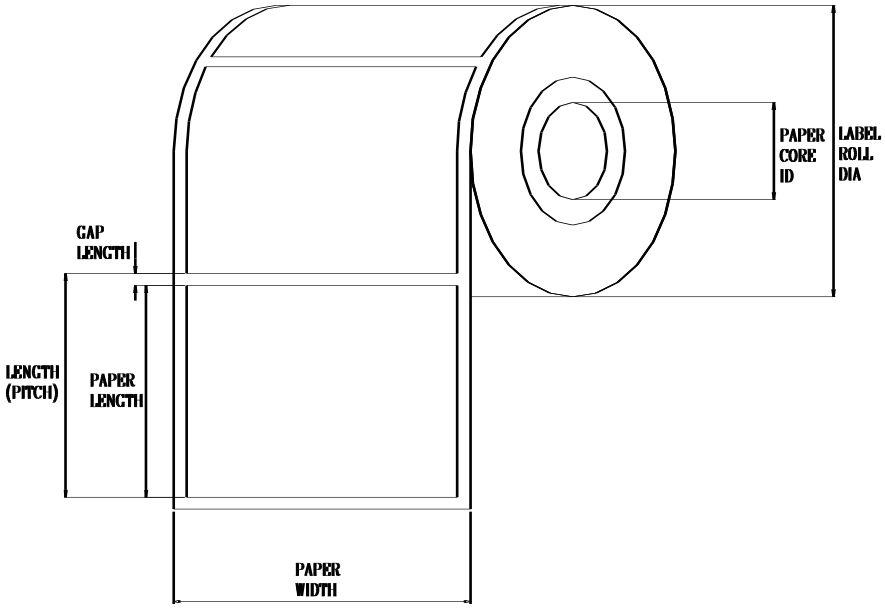
(3). In the peel off mode, the minimum pitch is 35mm.

(4). In the cutter mode, it is required the paper be wound outside. Otherwise, paper jam tends to result.

(5). In the cutter mode, the paper thickness is 0.2 mm at maximum, the paper weight is 100 g/$m^2$ at maximum.

(6). Paper shape is as shown on next page.

(7) Tag is 0.2mm in thickness, and is less than 240g/$m^2$ in weight.


PAPER
CORE
ID
LABEL
ROLL
DIA
GAP
LENGTH
LENGTH
(PITCH)
PAPER
LENGTH
PAPER
WIDTH

# 3. ELECTRONICS

## 3.1 Circuit Description

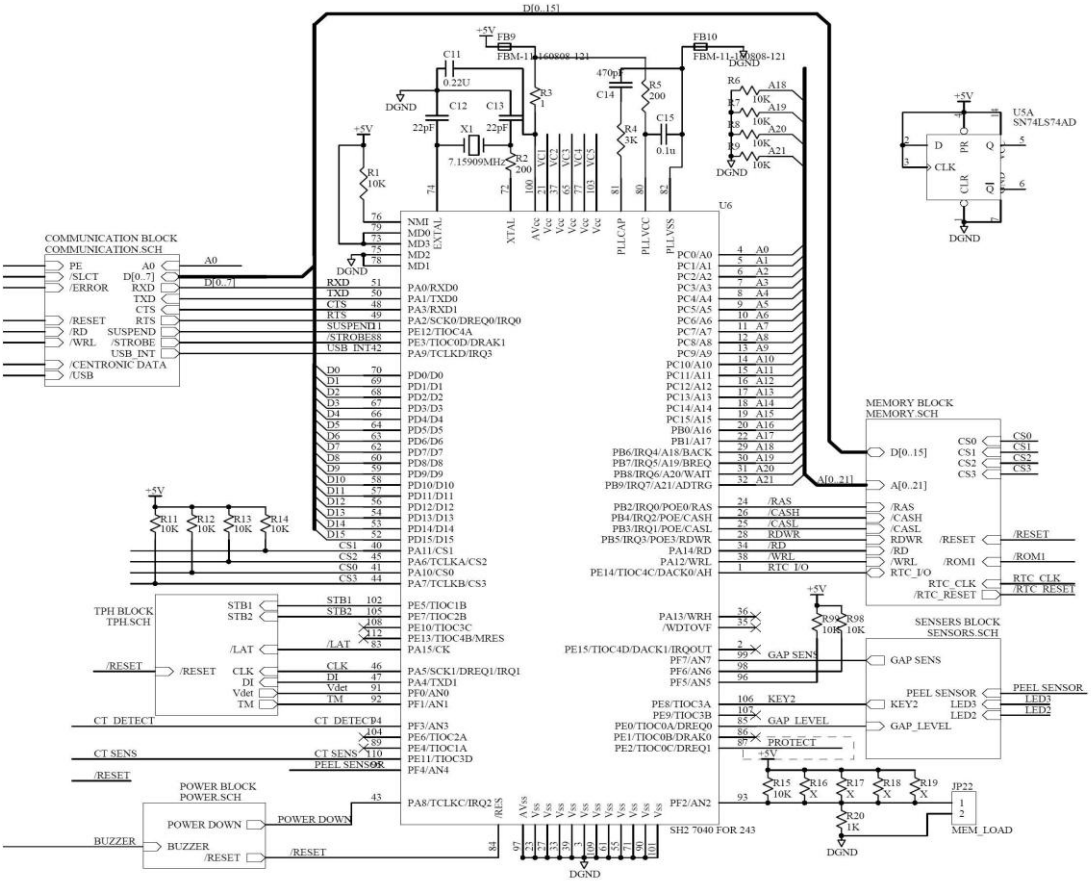



**Fig. 3.1 MCU Circuit Diagram**

The above is the MCU circuit diagram.

The main board of TDP-643R PLUS includes five system blocks:

A. Memory System (decoder & memory block)

B. Motor System (stepping motor and cutter block)

C. Print head System

D. Communication Port System (serial & parallel port block)

E. Power System

F. Sensor System

The figure below shows the PCB system area:

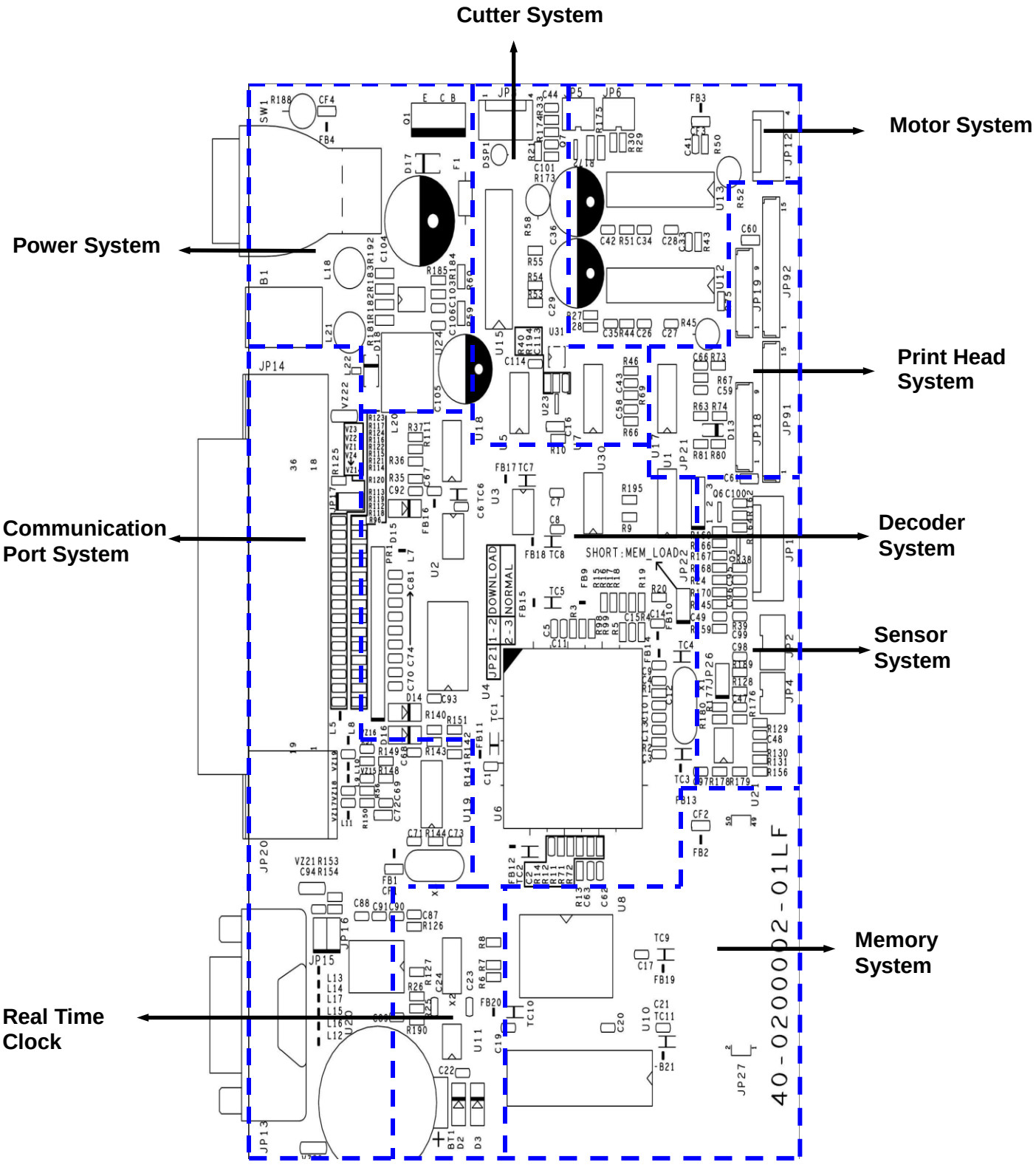



**Fig. 3.2 System Block of PCB**

## 3.2 MCU Pin Description

| Port | I/O | Initial | High | Low | Function | Instruction |
|---|---|---|---|---|---|---|
| PA0 | I | Pull Up | | | RXD0 | RXD for RS232 |
| PA1 | O | | | | TXD0 | TXD for RS232 |
| PA2 | I | Pull Up | | | PA2 | RTS for RS232 |
| PA3 | O | | | | PA3 | CTS for RS232 |
| PA4 | O | | | | TXD1 | DI for TPH |
| PA5 | O | | | | SCK1 | CLK for TPH |
| PA6 | O | Pull Up | | Active | /CS2 | /CS2 |
| PA7 | O | Pull Up | | Active | /CS3 | /CS3 |
| PA8 | I | | | Active | IRQ2 | Power down |
| PA9 | I | Pull Up | | Active | IRQ3 | USB_INT |
| PA10 | O | Pull Up | | Active | /CS0 | /CS0 |
| PA11 | O | Pull Up | | Active | /CS1 | /CS1 |
| PA12 | O | | | | /WRL | /WRL |
| PA13 | O | | | | /WRH | No use |
| PA14 | O | | | | /RD | /RD |
| PA15 | O | Pull Up | | Enable | PA15 | /LAT for TPH |
| PB0 | O | | | | A16 | A16 |
| PB1 | O | | | | A17 | A17 |
| PB2 | O | | | | /RAS | /RAS |
| PB3 | O | | | | /CASL | /CASL |
| PB4 | O | | | | /CASH | /CASH |
| PB5 | O | | | | RDWR | RDWR |
| PB6 | O | | | | A18 | A18 |
| PB7 | O | | | | A19 | A19 |
| PB8 | O | | | | A20 | A20 |
| PB9 | O | | | | A21 | A21 |
| PC0~PC15 | O | | | | A0~A15 | A0~A15 |
| PD0~PD15 | I/O | | | | D0~D15 | D0~D15 |
| PE0 | O | PWM | Enable | | TIOC0A | GAP LEVEL |
| PE1 | I | Pull Up | | | PE1 | KEY3 |
| PE2 | I | Pull Up | Enable | | PE2 | CASE OPEN |
| PE3 | I | Pull Up | | Enable | PE3 | /STTOBE for Centronic port |
| PE4 | O | PWM | | Enable | TIOC1A | DCM for DC motor enable |
| PE5 | O | Pull Up | Enable | | PE5 | STB1 for TPH |
| PE6 | I | Pull Up | | Enable | PE6 | DC SENS for DC sensor |
| PE7 | O | Pull Up | Enable | | PE7 | STB2 for TPH |
| PE8 | I | Pull Up | | | PE8 | KEY2 |
| PE9 | I | Pull Up | | | PE9 | KEY1 |
| PE10 | O | Pull Up | Enable | | PE10 | STB3 for TPH |
| PE11 | I | Pull Up | | Enable | PE11 | CT SENS for cutter sensor |
| PE12 | I/O | Pull Up | | | PE12 | SUSPEND for USB |

| | | | | | | |
|---|---|---|---|---|---|---|
| PE13 | O | Pull Up | Enable | | PE13 | STB4 for TPH |
| PE14 | I/O | | | | PE14 | RTC I/O |
| PE15 | I | Pull Up | Enable | | PE15 | HEAD SENS |
| PF0 | I | | | | PF0 | Vdet for TPH Voltage detect |
| PF1 | I | | | | PF1 | TM for TPH temperture |
| PF2 | I | | | Enable | PF2 | MEM load & Hardware version |
| PF3 | I | | | | PF3 | CT DETECT |
| PF4 | I | | | | PF4 | PEEL SENS |
| PF5 | I | | | | PF5 | RIBBON SENS |
| PF6 | I | | | | PF6 | BM SENS |
| PF7 | I | | | | PF7 | GAP SENS |
| | | | | | | |
| NMI | I | Pull Up | | | NMI | No use |
| /RESETP | I | Pull Up | | Active | /RESETP | /RESET |
| /WDTOVF | O | | | | /WDTOVF | No use |

IRQ0: NO USE
IRQ1: NO USE
IRQ2: Power down
IRQ3: USB_INT
IRQ4: NO USE
IRQ5: NO USE
IRQ6: NO USE
IRQ7: NO USE

Other define
1. System Crystal is 16 MHz.
2. USB Crystal is 48MHz.
3. RTC Crystal 32.768KHz.
4. MCU mode is mode 1.(16-bit space) ( MD0 is high, MD1 is low. )

Clock mode is PLL ON x 4. (MD2 is low, MD3 is High.)

## 3.3 Reset Circuit

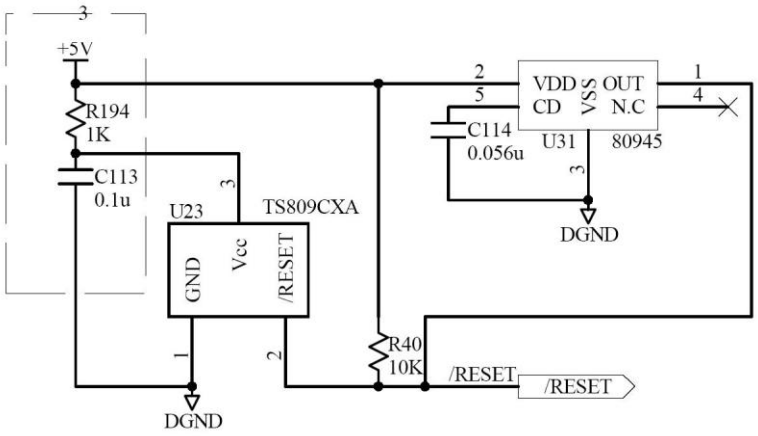



**Fig. 3.3 Reset Circuit**

This is the reset circuit .The TS809CXA IC outputs the system reset signal of "LOW" when the driving voltage is lower than 4.63V (Typical).

## 3.4 Memory System

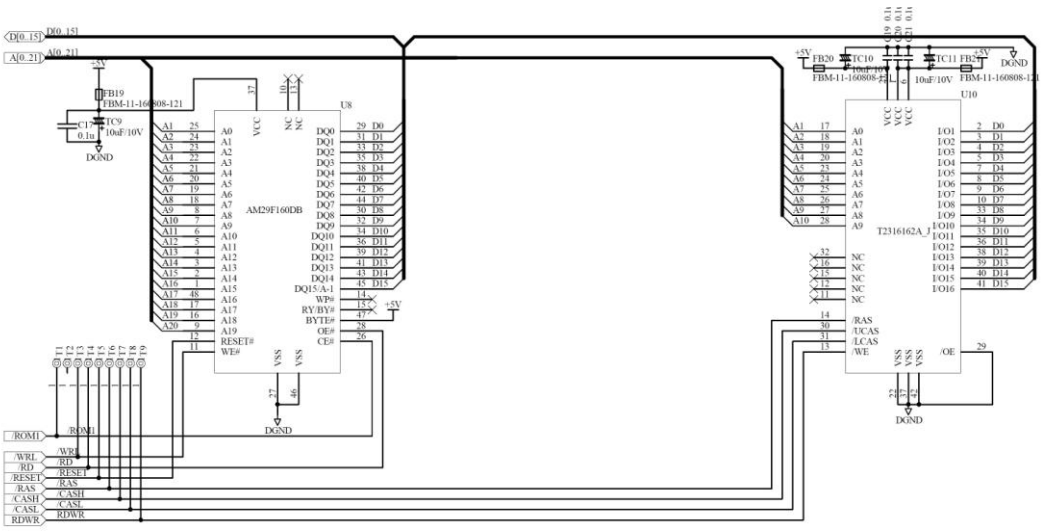



**Fig. 3.4 FLASH ROMS and DRAM Diagram**

This is the memory circuit. The U8 is 2M Byte FLASH ROM and U10 is 2M Byte DRAM.

## 3.5 Sensor & key

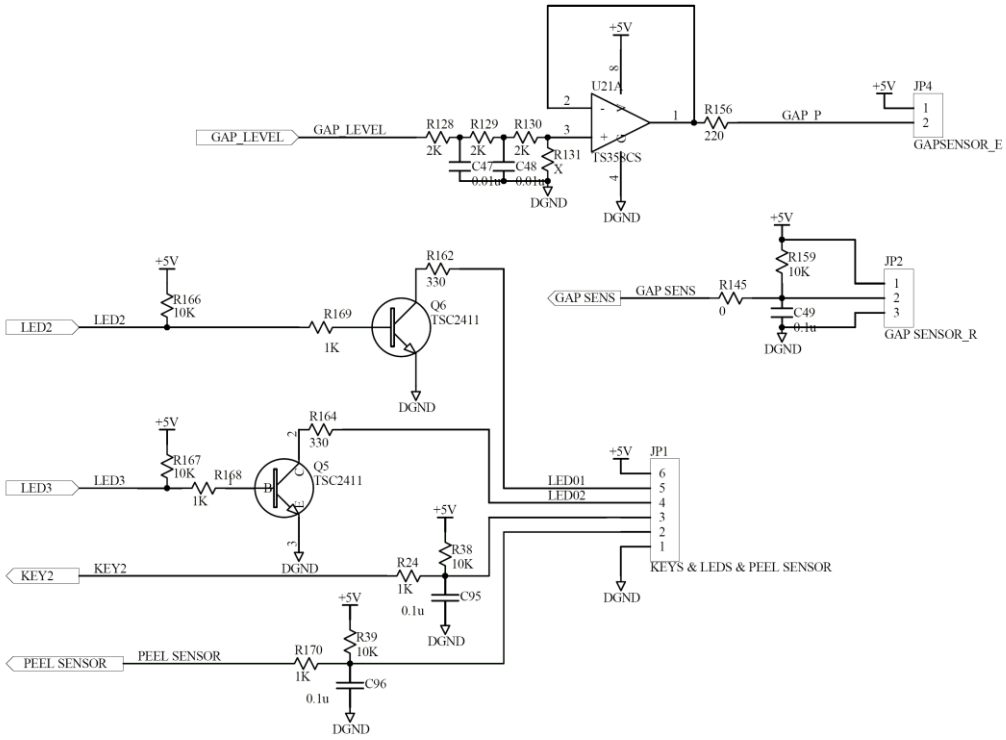



**Fig. 3.5 Semsor & Key Circuit Diagram**

A.
JP1 is the connector which connects to the LEDs and Keys.The signal of LED is High when the LED is bright; otherwise, it is low.
The signal of the key is low when the keys is press; otherwise, it is high.

B.
JP2 is the connector which connects to the gap sensor.
The gap sensor is a penetrable sensor. the gap sensor signal voltage is low when the gap is detected; otherwise, it is high.

C.
JP4 is the connector which connects to the gap emitter level, the gap level is a emitter source intensity control signal. It is a PWM signal.

## 3.6 Real-Time Clock Circuit

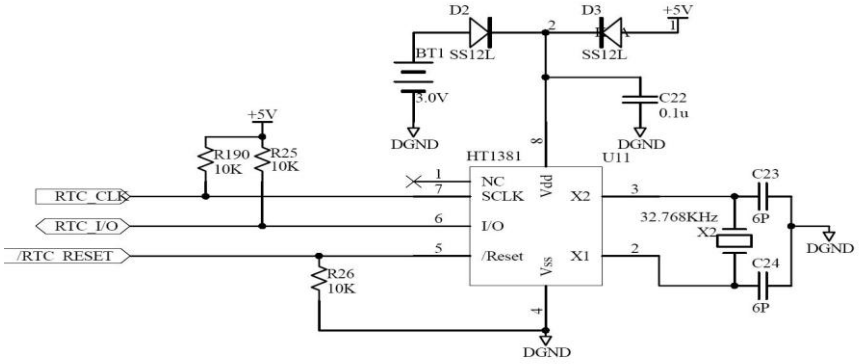



**Fig. 3.6 Real-Time Clock Circuit**

HT1381 is serial time keeper.

## 3.7 Decode Circuit

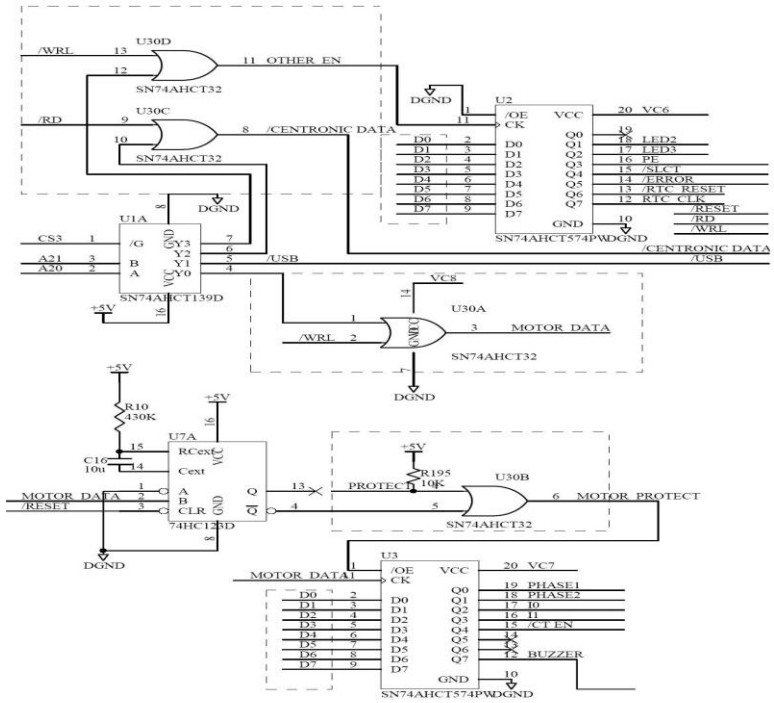



**Fig. 3.7 Decode Circuit**

CS0: (0000 0000 ~ 003F FFFF)
CS1: (0040 0000 ~ 007F FFFF)
CS2: (0080 0000 ~ 00BF FFFF)
CS3: (00C0 0000 ~ 0FFF FFFF)

ROM1: (0000 0000 ~ 001F FFFF)
ROM2: (0020 0000 ~ 003F FFFF)
Memory card :(0040 0000~007F FFFF)
Download ROM: (0800 0000 ~ 09F FFFF)
DRAM: (0100 0000~011F~FFFF)

Other Map

| Address | Bit | Function |
|---|---|---|
| 00C0 0000<br>MOTOR DATA | 0 | PHASE1 |
| | 1 | PHASE2 |
| | 2 | I0 |
| | 3 | I1 |
| | 4 | /CT EN |
| | 5 | DC PHASE |
| | 6 | TPH EN |
| | 7 | BUZZER |
| 00E0 0000<br>/CENTRONIC DATA | 0 | P_D0 |
| | 1 | P_D1 |
| | 2 | P_D2 |
| | 3 | P_D3 |
| | 4 | P_D4 |
| | 5 | P_D5 |
| | 6 | P_D6 |
| | 7 | P_D7 |

## 3.8 Thermal Head Drive/Protection and History Control Circuit

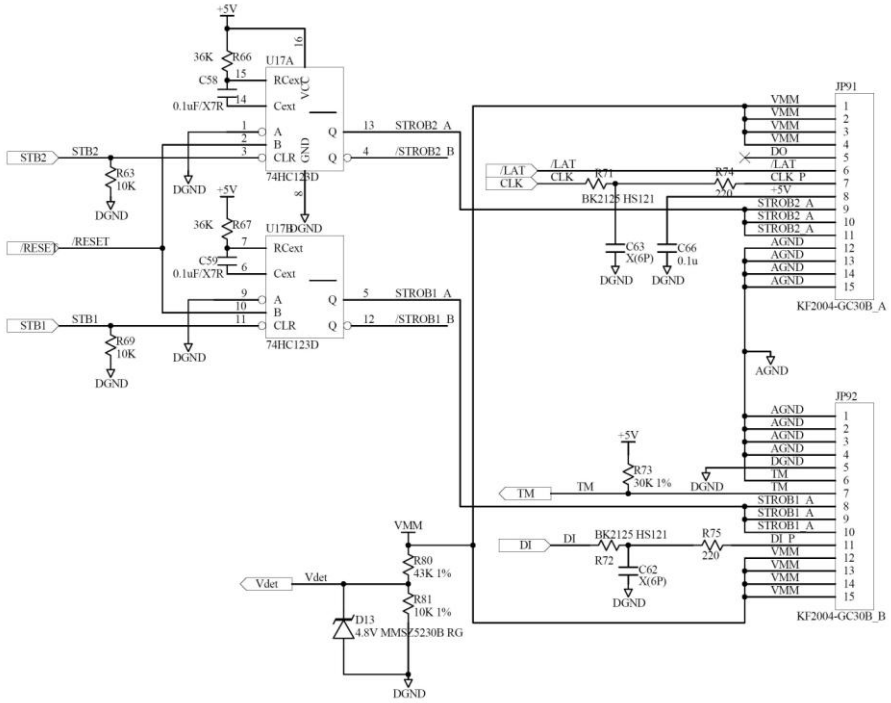



**Fig. 3.8 Thermal Head Drive/ Protection and History Control Circuit**

This is the thermal head drive/protection. CLK and /LAT connected to thermal head control clock and data latch respectively. STB1 & STB2 determines whether to heat the thermal head or not. DI sends the printer data to the print head. TM is the temperature/voltage sensor for thermal head. Vdet feeds back the voltage and compensates the heat time for voltage accuracy when printing.

## 3.9 24V/5V Converter Circuit

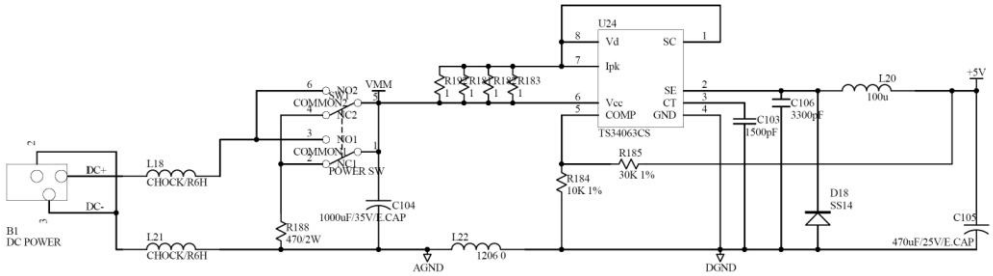



**Fig. 3.9 24V/5V Converter Circuit**

Figure 3.10 is the DC-TO-DC (DC24V to DC 5V) converter circuit, which is a boost system circuit structure. U24 is the DC-TO-DC converter IC, which can convert voltage by using PWM control mode.

## 3.10 Stepping Motor Driver /Protection Circuit

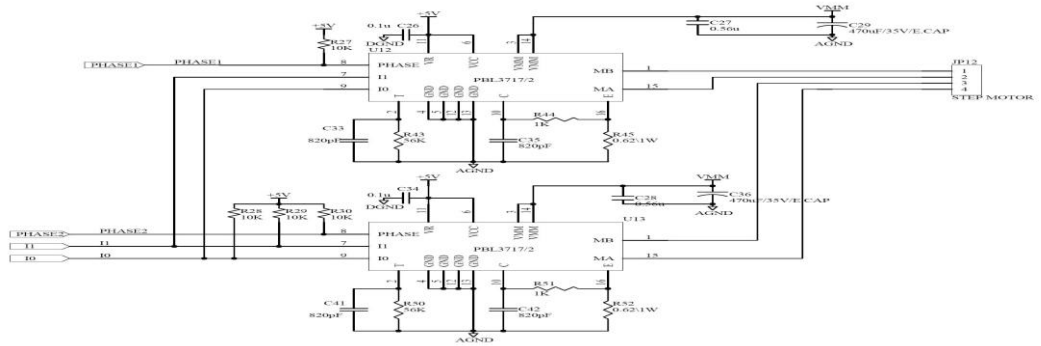



**Fig. 3.10 Stepping Motor Driver/ Protection Circuit**

This is the Stepping Motor and / Protection Circuit. Connector JP12 sends the pattern as shown in table1. The status of I0 & I1 determines the stepping motor power level, the power level pattern is shown in table2. Motor port is the protection pin. When it is at 'LOW' level, the power of the motor system will be closed. Power will be ON again until MOTOR pin is the pulse of 'HIGH' level. PHASE1 and PHASE2 determine the pattern of stepping motor drive circuit. For example, the sequence of PHASE1/PHASE2 in full step mode is 0/0 → 0/1 → 1/1 → 1/0.

| Pin on / Step JP12 | 1 | 2 | 3 | 4 | PHASE |
|---|---|---|---|---|---|
| 1 | ON | ON | | ON | A |
| 2 | | ON | ON | | /A |
| 3 | ON | | ON | ON | /B |
| 4 | | ON | ON | | B |

**Table1 Stepping Motor Pattern**

| MOTOR CURRENT | | I0 | I1 |
|---|---|---|---|
| HIGH LEVEL | 100% | L | L |
| MEDIUM LEVEL | 60% | H | L |
| LOW LEVEL | 20% | L | H |
| ZERO CURRENT | 0% | H | H |

**Table2 Stepping motor power pattern**

## 3.11 Communication (Serial & Parallel Port) Circuit

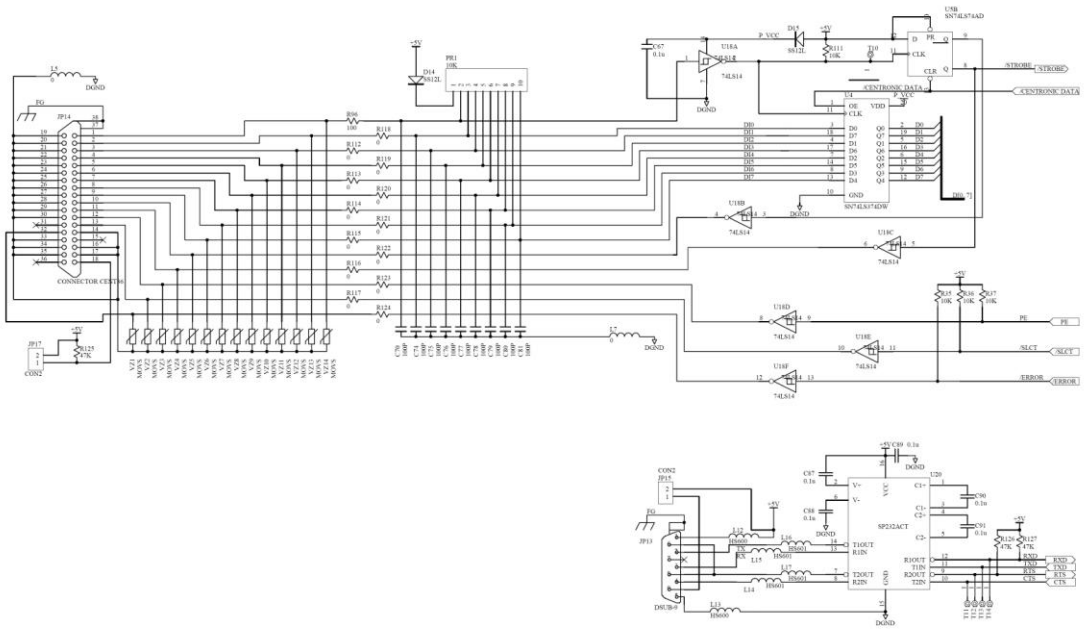


**Fig. 3.11 RS-232 (Serial Port) Circuit**

The RS-232 Circuit is for use with the externally connected personal computer and keyboard unit. JP13 connects to PC serial port through the RS-232 cable. RxD is the data receive pin of MCU. CTS is the Clear To Send of MCU, which sends the signal from the external device. TxD is the data output pin of MCU. RTS is the Request To Send signal which MCU sends to the external device.

The parallel port circuit is for use with the externally connected personal computer parallel port through the printer cable. When PC's strobe signal comes in, the printer responds the 'busy status' until it reads the data from parallel port. Printer will respond the 'error signal' to PC when it is in error status.

## 3.12 Cutter Drive Circuit

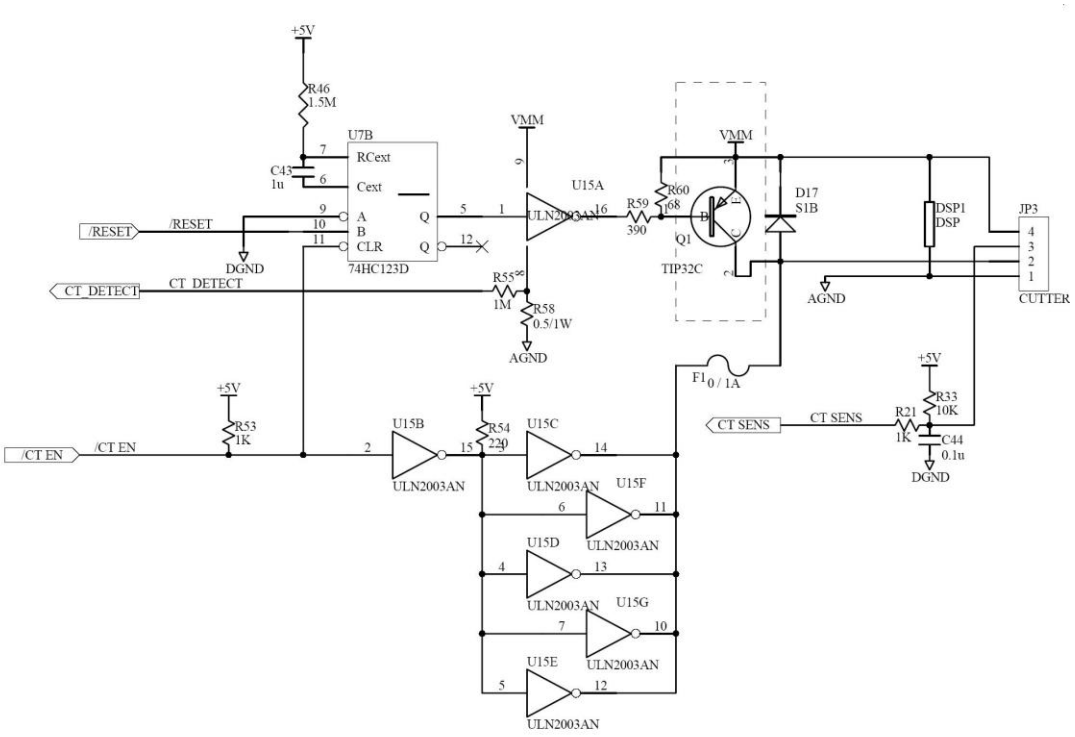



**Fig. 3.12 Cutter Drive Circuit**

This is the cutter drive circuit. The RESET signal is 1 when the printer is turned on. CUTTER controls the activation of the cutter. The cutter is activated when CUTTER signal is “Low”. The sensor of cutter sends the “Hi-Lo” signal to MCU through CTSENS pin that detects the action of cutter.

# 4. MECHANISM

## 4.1 Mainboard Replacement

1. Turn off printer power.
2. Remove power cord and RS-232 and/or parallel port cable.
3. Form the button of the printer, remove the 6 screws.

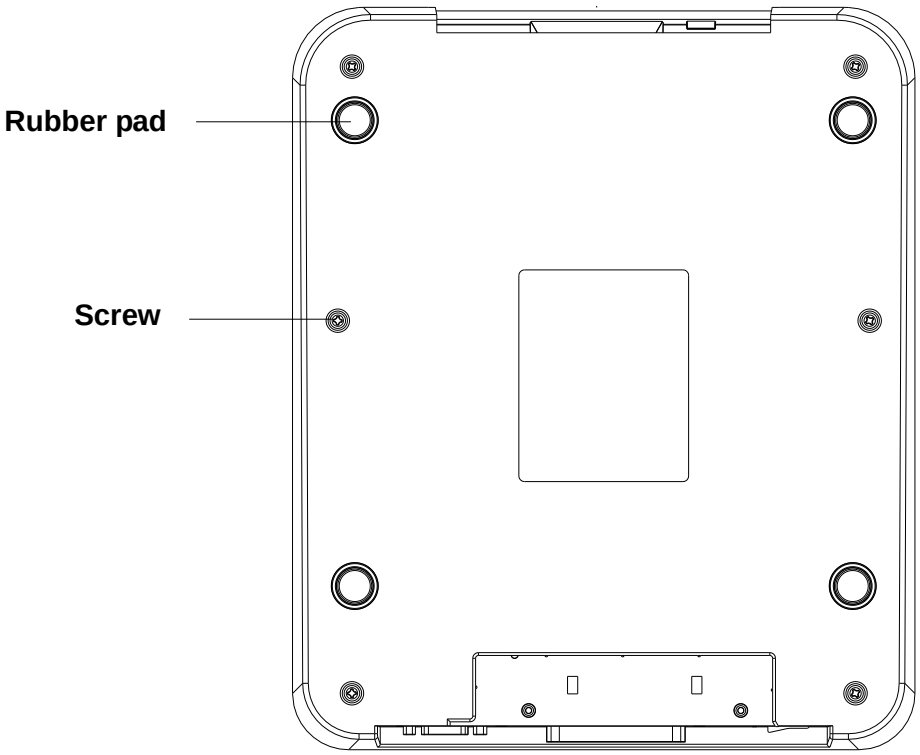



**Fig. 4-1 Remove the rubber pads and screws**

4. Detach the printer top cover.
5. Disconnect all harnesses on the mainboard.

6. Remove 2 hexagon screws and 2 screws on the rear of the printer.

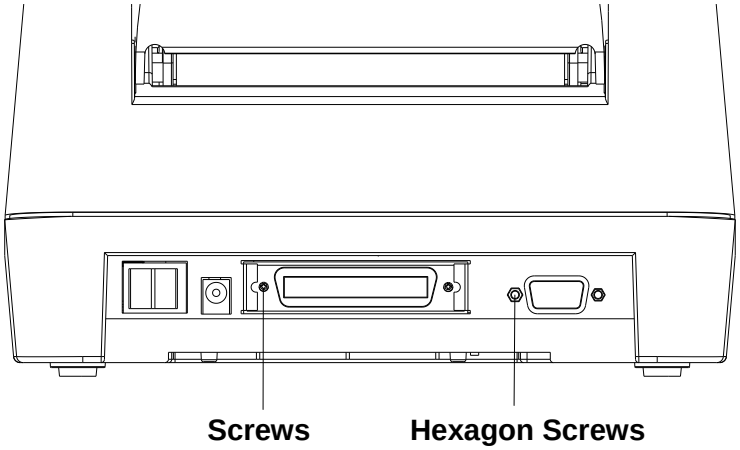



**Fig. 4-2 Remove screws on the rear of the printer**

7. Remove 4 mainboard fixing screws.

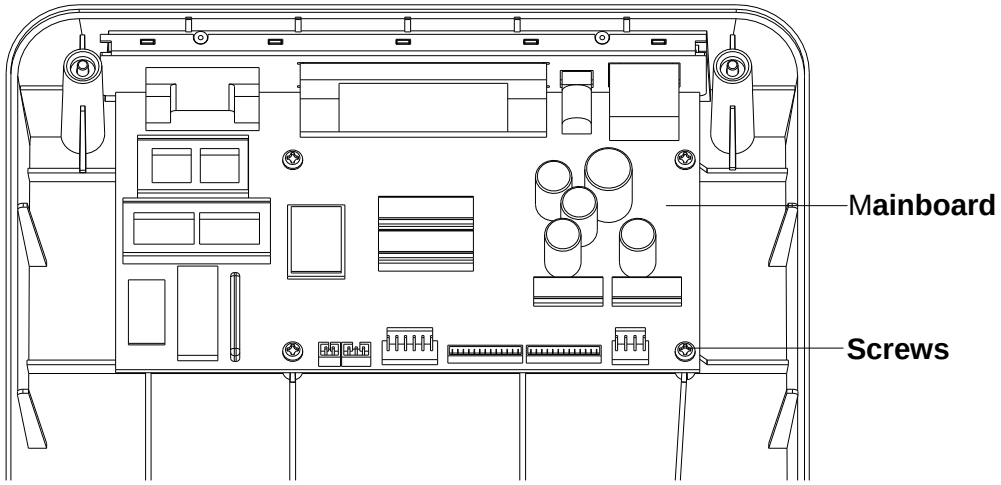



**Fig. 4-3 Remove 4 screws on the mainboard**

8. Replace the mainboard.
9. Assemble the detached parts in the reverse order of that of removal.

## 4.2 Stepping Motor Driver IC Replacement

1. Turn off printer power.
2. Remove power cord and RS-232 and/or parallel port cable.
3. Form the button of the printer, remove the 6 screws.
4. Remove the failed stepping motor driver IC with an IC clamp.

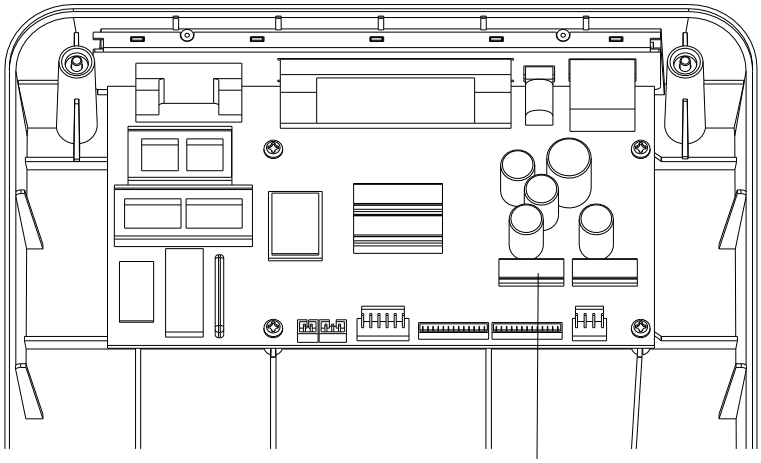



**Fig. 4-5 Replace stepping motor driver IC**

5. Insert new stepping motor driver IC in the socket

## 4.3 Print Head Replacement

1. Turn off printer power.
2. Remove power cord and RS-232 and/or parallel port cable.
3. Form the button of the printer, remove the 6 screws.
4. Detach the printer top cover and disconnect peel-off sensor connector from the cover.
5. Hold on the spring holder, turn the paper release lever and push the release lever rod out of the fixture.

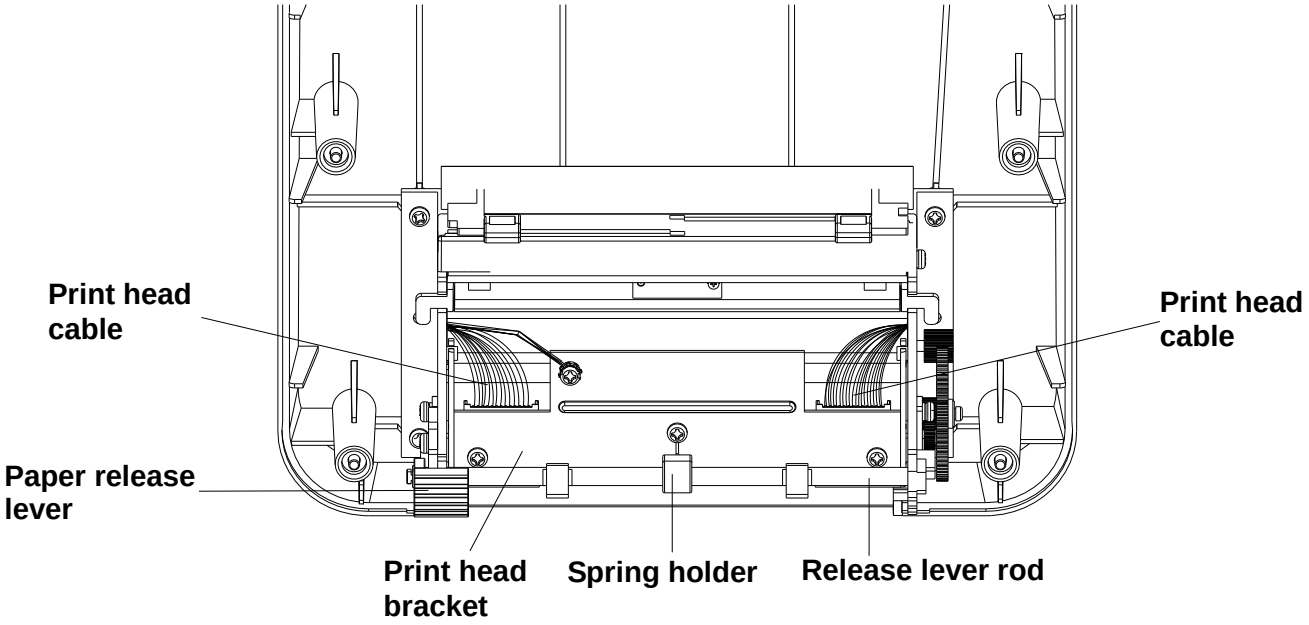



**Fig. 4-6 Replace print head**

6. Loosen the 2 fixing screws on the print head bracket. (Please refer to the Fig. 4-5)
7. Disconnect the print head cable on either side of the print head.
8. Replace with new print head.
9. Assemble the detached parts in the reverse order of the above.

***Note:Do not touch the elements of the print head.***
***Do not disassemble the print head.***

## 4.4 Stepping Motor Replacement

1. Turn off printer power.
2. Remove power cord and RS-232 and/or parallel port cable.
3. Form the button of the printer, remove the 6 screws.
4. Detach the printer top cover and disconnect peel-off sensor connector from the cover.
5. Loosen the 4mechanism fixing screws on the mechanism mount.
6. Detach print head mechanism.
7. Remove E-ring and outer gear.

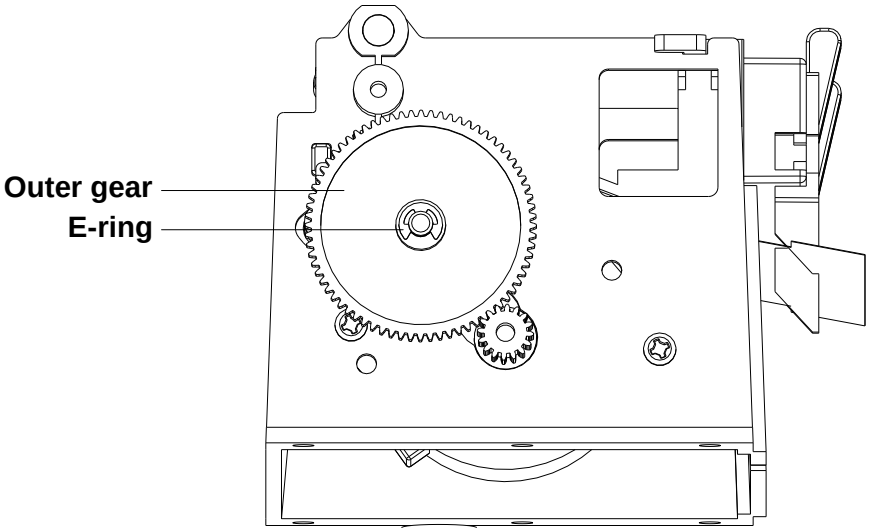



**Fig. 4-7 Remove E-ring and outer gear**

8. Loosen 2 motor fixing screws and disconnect motor connecter.

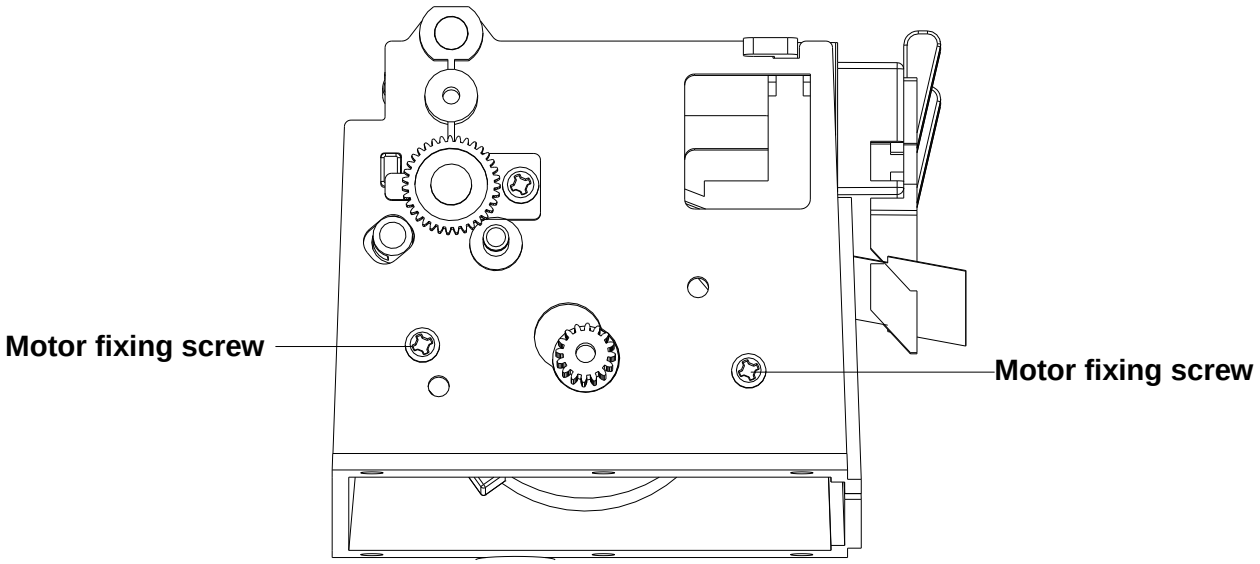



**Fig. 4-8 Loosen 2 motor fixing screws**

9. Replace damage motor.
10. Assemble the detached parts in reverse order of the above.

## 4.5 Gap Sensor Transmitter/Receiver Replacement

1. Turn off printer power.
2. Remove power cord and RS-232 and/or parallel port cable.
3. Form the button of the printer, remove the 6 screws.
4. Detach the printer top cover and disconnect peel-off sensor connector from the cover.
5. Loosen the 4 mechanism fixing screws on the mechanism mount.
6. Detach print head mechanism.
7. Loosen 1 screw on the gap sensor transmitter and 1screw on the gap sensor receiver.

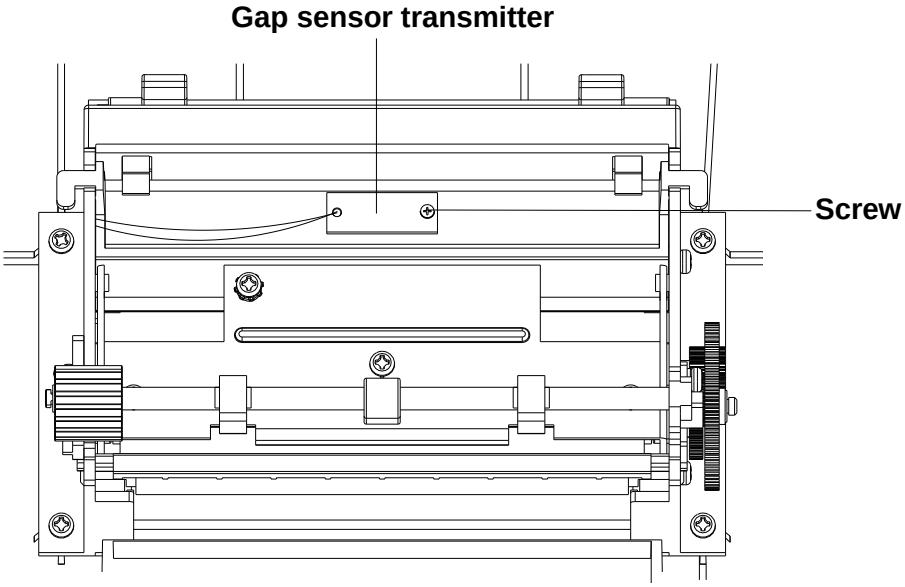



**Fig. 4-9 Loosen gap sensor screws**

8. Replace gap sensor.
9. Assemble the detach parts in the reverse order of the above.

## 4.6 Platen and Teflon Tube Replacement

1. Turn off printer power.
2. Remove power cord and RS-232 and/or parallel port cable.
3. Form the button of the printer, remove the 6 screws.
4. Detach the printer top cover and disconnect peel-off sensor connector from the cover.
5. Loosen the 4 mechanism fixing screws on the mechanism mount.
6. Detach print head mechanism.
7. Detach the print head and gap sensor.
8. Remove the E-ring and outer gear.
9. Remove the inner gear and bushes on either side.

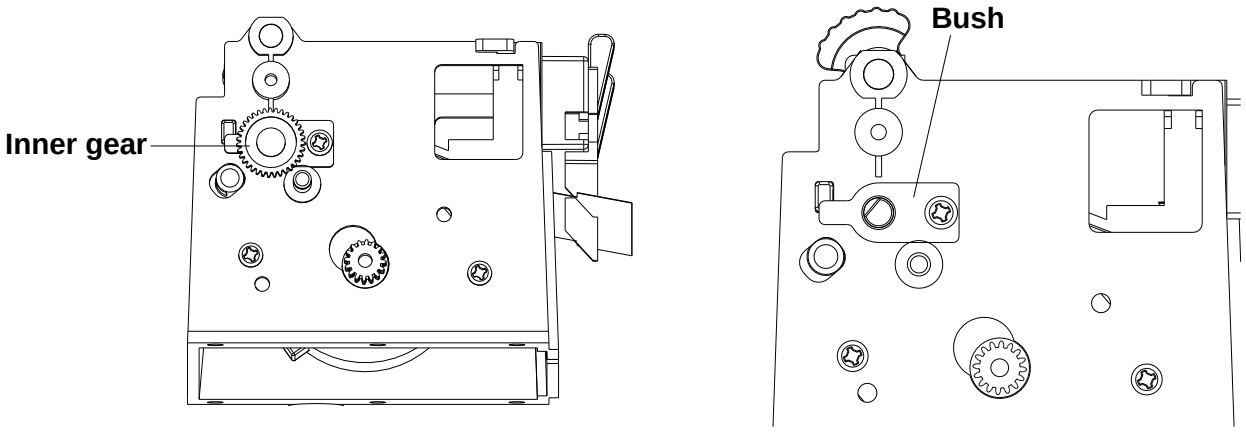



**Fig. 4-10 Remove inner gear and bushes**

10. Replace the platen.

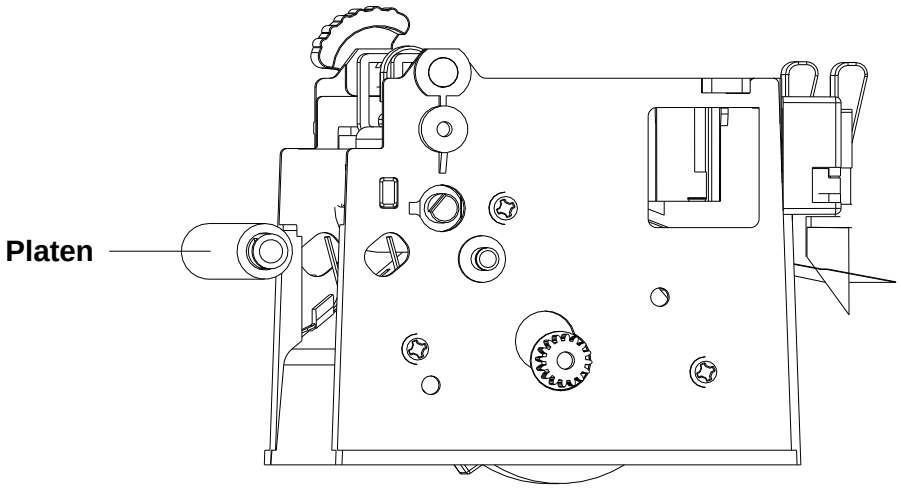



**Fig. 4-11 Remove platen**

11. Turn the teflon tube driving rod with a screw.
12. Push the driving rod out of the fixture.
13. Replace the teflon tube.
14. Assemble the detached parts in the reverse order of the above.

# 5. TROUBLE SHOOTING

## 5.1 Error Messages

**Syntax Error:**
The command format is incorrect. Check user's manual to be sure.
The serial port setting is incorrect. Check protocol in dump mode and reset the printer.

**Out of Range:**
Numeric input is too large to be processed.
The input string is too long to be stored.
The size of the text of bar code exceeds that of the label.

**Download Error:**
The format of the downloaded file is incorrect.
There is not enough memory to store the file.

**Stack Overflow:**
Program contains too complex mathematical expressions. Divide into several expressions.
There is too much nested routine.

**Memory Error:**
Too many variables defined.

**RS-232 Error:**
The serial port setting is incorrect.

**File Not Found:**
Cannot open the file specified. Download the file again.

**Type Mismatch:**
Variable type mismatch.

**Gap Not Found:**
Cannot detect label edge. Calibrate the backing paper again.

**Clock Access Error:**
Can not read from/write to the clock.

## 5.2 Trouble Shooting

| Item | Problems | Solutions |
|---|---|---|
| 1 | Ribbon does not advance. | ● Check the printing mode setting and reset the printer. |
| 2 | Poor print quality. | ● Clean the print head.<br>● Adjust the print density setting. |
| 3 | Only prints diagonal pattern in the self-test. | ● Ribbon and paper are incompatible. Use a different type of ribbon. |
| 4 | Power indicator light does not illuminate. | ● Check the connection of serial port cable. |
| 5 | On-line indicator light does not to illuminate. | ● Check that power cord is properly connected. |
| 6 | Error indicator remains illuminated. | ● Press the FEED key. The error message will be printed out on the print media or sent out through RS-232 port. |

## 5.3 Self Test and Gap Sensor Calibration

1. Turn off the printer.
2. Press FEED button while turning on the printer. Instantly the red and green indicators will flash alternately.

Release the button when this happens, wait for 10 seconds, and the printer will calibrate the label length as well as detect the gap sensor emission strength. If label gap is not detected within 7 inches, the printer stops feeding labels and the media is regarded as continuous paper.

## 5.4 Initialization

1. Turn off the printer.
2. Press FEED button while turning on the printer. Instantly the red and green indicators will flash alternately.
3. Press FEED button again and printer will be initialized.

***Note: When initialization is done, please calibrate the gap sensor again.***

## 5.5 Diagnosis Operation Procedure

When the power is turned on without any button pressed, self diagnosis is performed automatically to test the available memory. If any error occurs during this period, the ERR light will flash.

Do the self test and inspect the test pattern to check if the thermal head is available.

## 5.6 Testing Sensor

### 5.6.1 Checking Gap Sensor

Do gap calibration first by holding the Pause button and activating the printer power at the same time. If the calibration result is OK, go on and check the gap sensor. Switch the multimeter to the DC gear. Connect the black wire to DC GND, and the red wire to PIN2 of JP2. Load label on the printer.

1. When gap (backing paper only) is detected between TX and RX of the gap sensor, the measured voltage should be 0 Vdc.
2. When gap (backing paper only) is not detected between TX and RX of the gap sensor, the measured voltage should be 5 Vdc.

The gap sensor is normal if the checking complies with the two cases above. Or else, the gap sensor is out of order.

### 5.6.2 Checking Peel Off Sensor

Switch the multimeter to the DC gear. Connect the black wire to DC GND, and the red wire to PIN2 of JP1.

1. When label is detected by the peel off sensor, the measured voltage should be 0 Vdc.
2. When label is not detected by the peel off sensor, the measured voltage should be 5 Vdc.

The peel off sensor is normal if the checking complies with the two cases above. Or else, the peel off sensor is out of order.

## 5.7 Cleaning the Print Head

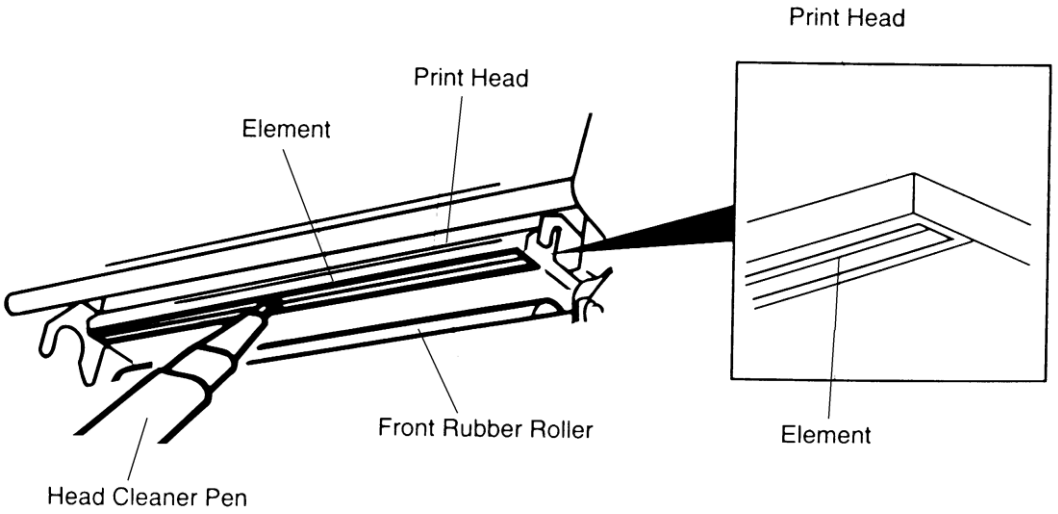
The printer should be cleaned regularly to retain high quality and optimum performance. The greater the usage of the printer, the more frequent the cleaning.

1. Always turn off the printer before cleaning the print head. Allow the printhead to cool for a minimum of one minute.
2. Take out the print head. (Please refer to the steps on the 4.4 section)
3. Clean the print head element with a head cleaner pen or use a cotton swab and 100% ethanol to clean the print head surface.

Note:

*Do not touch printer head by hand. If you touch it careless, please use ethanol to clean it.

*It's industry alcohol. Please do not use regular alcohol, which may damage the printer head.



Update History

| Date | Content | Editor |
|---|---|---|
| 2006/8/17 | 1. Modify the 5 item 20 : Main board ass'y from 98-0200046-10LF to 98-0200046-20LF | Camille |
| 2006/8/28 | 1. Add the 5 item 20 : Main board ass'y + RTC<br>2. Add the 5 item 29 : External Ethernet print server (C)(Z) | Camille |
| 2007/1/12 | 1. Modify the 5 item 25 : Cutter driver IC from 80-ULN2003-00LF to 80-ULN2003-01LF | Camille |
| 2007/3/9 | 1. Modify the 5 item 29 : External Ethernet print server (C) part no. | Camille |
| 2007/4/14 | 1. Update TSC e-mail address<br>2. Update 6.7 section:cleaning the print head | Camille |
| 2007/8/1 | 1. Company information update | Camille |
| 2007/12/7 | 1. Modify power supply and external Ethernet print server parts no./CEC | Camille |
| 2008/1/23 | 1. Revoke part number for 98-1000017-00LF External Ethernet print server (Z)/US & 98-1000018-00LF External Ethernet print server (Z)/EU<br>2. Modify description for 98-1000008-01LF External Ethernet print server (C)/US/CEC & 98-1000009-00LF External Ethernet print server (C)/EU | Camille |
| 2008/3/18 | Add switching power/CEC part no. for second source | Camille |
| 2008/7/10 | Remove the parts list section | Camille |
| 2011/1/25 | Modify TSC address | Camille |
| | | |

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